

WE CLAIM:

- [C1]** A method of making a microarray with a macroporous polymer substrate, the method comprising:
- (a) obtaining a macroporous polymer substrate; and
 - (b) coating a surface with the substrate.
- [C2]** The method of claim 1, wherein the macroporous polymer substrate is synthesized by a method comprising:
- (a) obtaining methacrylates;
 - (b) mixing the methacrylates in the presence of a porogenic solvent; and
 - (c) initiating polymerization to form a macroporous polymer substrate.
- [C3]** The method of claim 2, further comprising:
- (a) obtaining at least one immobilization chemical for immobilization of biomolecules to the microarray; and
 - (b) adding the immobilization chemical to the macroporous polymer substrate.
- [C4]** The method of claim 3, wherein the macroporous polymer substrate is applied to a surface selected from the group consisting of glass, metal, silane, silicone, and plastics with vinyl.
- [C5]** The method of claim 1, wherein the biomolecules are selected from the groups consisting of DNA, RNA, peptides, proteins, lipids, lipopolysaccharides, antibodies, and peptide mimetics.
- [C6]** The method of claim 2, wherein the methacrylates are selected from the group consisting of monofunctional methacrylates and polyfunctional methacrylates.
- [C7]** The method of claim 6, wherein the monofunctional methacrylates are selected from the group consisting of alkyl-, epoxyalkyl-, hydroxyalkyl-, and polyoxyalkyl ethers of methacrylic acid.
- [C8]** The method of claim 6, wherein the polyfunctional methacrylates are selected from the group consisting of dimethacrylates of ethylene glycol, di-, tri-, and tetramethacrylates of polyols.
- [C9]** The method of claim 2, wherein the methacrylates are selected from the group consisting of GMA, HEMA, EDMA, and DHDM.

- [C10]** The method of claim 2, wherein the porogenic solvent is an aromatic alcohol.
- [C11]** The method of claim 10, wherein the aromatic alcohol is selected from the group consisting of cyclohexanol and dodecanol.
- [C12]** The method of claim 2, wherein the porogenic solvent is an aliphatic alcohol.
- [C13]** The method of claim 2, wherein the porogenic solvent is an aromatic alkyl derivative.
- [C14]** The method of claim 3, wherein the immobilization chemical is derivatized to include functional groups selected from the group consisting of aldehydes, succinimides and isothiocyanates.
- [C15]** The method of claim 3, wherein the immobilization chemical is selected from the group consisting of N-(methacryloyl) aminocaproic acid N-hydroxysuccinimide ether, 4-isothiocyanate-N-(methacryloyl) benzylamine, and N-(5,6-di-O-isopropylidene) hexyl acrylamide.
- [C16]** A method of analyzing molecular interactions, the method comprising the steps of:
- (a) immobilizing at least one probe molecule to a macroporous polymer substrate comprising a monofunctional methacrylate, a polyfunctional methacrylate, and a solvent;
 - (b) obtaining at least one analyte molecule;
 - (c) providing suitable conditions for the probe-analyte interaction; and
 - (d) measuring signal from the interaction.
- [C17]** The method of claim 16, wherein the probe molecule is selected from the group consisting of antibodies, peptides, proteins, and DNA.
- [C18]** The method of claim 16, wherein the analyte is derived from a biological sample.
- [C19]** The method of claim 16, wherein the probe-analyte interaction is an antigen-antibody interaction.
- [C20]** The method of claim 16, wherein the probe-analyte interaction is a nucleic acid hybridization.
- [C21]** A microarray with a macroporous polymer substrate comprising:
a monofunctional methacrylate,

a polyfunctional methacrylate or a mixture thereof;
an immobilization chemical; and
a porogenic solvent.

- [C22]** The macroporous polymer substrate of claim 21, wherein the monofunctional methacrylates are selected from the group consisting of glycidyl methacrylate, and 2-hydroxyethyl methacrylate.
- [C23]** The macroporous polymer substrate of claim 21, wherein the polyfunctional methacrylate is selected from the group consisting of ethylene dimethacrylate, and 2,3-dihydroxybutane-1,4-diyl dimethacrylate.
- [C24]** The macroporous polymer substrate of claim 21, wherein the immobilization chemical is selected from the group consisting of N-(methacryloyl) aminocaproic acid N-hydroxy succinimide ether, 4-isothiocyanate-N-(methacryloyl) benzylamine, and N-(5,6-di-O-isopropylidene) hexyl acrylamide.
- [C25]** The macroporous polymer substrate of claim 21, wherein the porogenic solvent is selected from the group consisting of cyclohexanol and dodecanol.
- [C26]** The macroporous polymer substrate of claim 21 comprising 4-30% GMA, 2-20% of EDMA, 0-5% MAAHSE, 48-60% cyclohexanol, and 0-12% dodecanol.
- [C27]** The macroporous polymer substrate of claim 21 comprising 4-30% GMA, 2-20% of DHDM, 0-5% ITCMBA, 48-60% cyclohexanol, and 0-12% dodecanol.
- [C28]** The macroporous polymer substrate of claim 21 comprising 4-30% GMA, 2-20% of EDMA, 0-5% ITCMBA, 48-60% cyclohexanol, and 0-12% dodecanol.
- [C29]** The macroporous polymer substrate of claim 21 comprising 4-30% GMA, 2-20% of DHDM, 0-5% MAAHSE, 48-60% cyclohexanol, and 0-12% dodecanol.
- [C30]** The macroporous polymer substrate of claim 21 comprising 4-30% HEMA, 2-20% of EDMA, 0-5% MAAHSE, 48-60% cyclohexanol, and 0-12% dodecanol.
- [C31]** The macroporous polymer substrate of claim 21 comprising 4-30% HEMA, 2-20% of DHDM, 0-5% ITCMBA, 48-60% cyclohexanol, and 0-12% dodecanol.
- [C32]** The macroporous polymer substrate of claim 21 comprising 4-30% HEMA, 2-20% of EDMA, 0-5% ITCMBA, 48-60% cyclohexanol, and 0-12% dodecanol.
- [C33]** The macroporous polymer substrate of claim 21 comprising 4-30% HEMA, 16% of DHDM, 0-5% MAAHSE, 48-60% cyclohexanol, and 0-12% dodecanol.
- [C34]** A macroporous polymer substrate comprising:
a monofunctional methacrylate;
a polyfunctional methacrylate; and

a solvent.

- [C35]** The macroporous polymer substrate of claim 34, wherein the monofunctional methacrylate is selected from the group consisting of glycidyl methacrylate, and 2-hydroxyethyl methacrylate.
- [C36]** The macroporous polymer substrate of claim 34, wherein the polyfunctional methacrylate is selected from the group consisting of ethylene dimethacrylate, and 2,3-dihydroxybutane-1,4-diyl dimethacrylate.
- [C37]** The macroporous polymer substrate of claim 34, wherein the solvent is selected from the group consisting of cyclohexanol and dodecanol.